IN THE CLAIMS:

1. (CURRENTLY AMENDED) A method for efficiently searching a hash table containing a plurality of ranges, the method comprising:

    performing one or more preliminary range checks on at least one target value, each preliminary range check generating an output value having a value dependent on whether the target value is included in a predefined range of values associated with the preliminary range check;

    combining signature information with the output values generated by the preliminary range checks to generate a modified signature;

    applying a predetermined function to the modified signature to derive an index that references a hash-table entry in the hash table;

    locating a searchable data structure associated with the hash-table entry referenced by the index, the searchable data structure comprising one or more search nodes, at least one of the search nodes configured to store one or more target-value ranges associated with the target value; ~~and~~

    searching the search nodes in the searchable data structure until a matching search node is found whose stored target-value ranges associated with the target value include the target value; and

    providing information associated with the matching search node.

2. (ORIGINAL) The method of claim 1, wherein the searchable data structure is a linked list and the search nodes in the searchable data structure are linked-list entries.

3. (ORIGINAL) The method of claim 1, wherein the output values generated by the preliminary range checks are concatenated with the signature information to generate the modified signature.

1 4. (ORIGINAL) The method of claim 1, wherein the step of searching the search nodes in

2 the searchable data structure further comprises:

3   searching the search nodes until a matching search node is found that not only

4 stores target-value ranges including their associated target values, but also stores the sig-

5 nature information.

1 5. (ORIGINAL) The method of claim 4, wherein the signature information and the target

2 value are obtained from predetermined fields in a packet's network headers or from other

3 packet-related information.

1 6. (CURRENTLY AMENDED) The method of claim 5, wherein the information associ-

2 ated with the matching search node is data-flow information and the method further com-

3 prisesing:

4   extracting the data-flow information from the matching search node, the data-flow

5 information being used to route the packet.

1 7. (ORIGINAL) The method of claim 1, wherein the step of applying a predetermined

2 function to the modified signature generates one or more output bits, and a predetermined

3 set of the output bits are masked to derive the index.

1 8. (CURRENTLY AMENDED) An intermediate network node configured to perform

2 flow-based processing, the intermediate network node comprising:

3   a network interface for receiving a data packet;

4   a memory adapted configured to store a hash table organized as a plurality of in-

5 dexed hash-table entries, each hash-table entry associated with a corresponding linked list

6 and each linked list containing one or more linked-list entries; and

7   a system controller configured to efficiently search the hash table, the system con-

8 troller configured to:

3

9   obtaining signature information and at least one target value from a

10   set of predetermined fields in the received packet's network headers;

11   performing one or more preliminary range checks on at least one

12   of the target values, each preliminary range check generating an output

13   value having a value dependent on whether the target value is included in

14   a predefined range of values associated with the preliminary range check;

15   combineing the signature information with the output values gen-

16   erated by the preliminary range checks to generate a modified signature;

17   applying a predetermined function to the modified signature to de-

18   rive an index that references a hash-table entry in the hash table;

19   locateing a linked list associated with the hash-table entry refer-

20   enced by the index, the linked list comprising one or more linked-list en-

21   tries, each entry configured to store at least one target-value range associ-

22   ated with the target value; and

23   searching linked-list entries in the linked list until a matching

24   linked-list entry is found whose stored target-value ranges associated with

25   the target value include the target value; and

26   provide information associated with the matching linked-list entry.

1   9. (CURRENTLY AMENDED) The intermediate network node of claim 8, further com-

2   prising a processor,

3   wherein the memory is further adapted configured to store instructions for execu-

4   tion by the processor, at least a portion of the instructions defining a router operating sys-

5   tem configured to route the received packet based on a data flow associated with the re-

6   ceived packet.

1   10. (CURRENTLY AMENDED) The intermediate network node of claim 9, wherein the

2   information associated with the linked-list entry is data-flow information and the system

3   controller identifies the data-flow information stored in the matching linked-list entry and

4   transfers the data-flow information to the router operating system which routes the re-

5   ceived packet in accordance with the data-flow information.

1   11. (ORIGINAL) The intermediate network node of claim 8, wherein the system control-

2   ler searches the linked-list entries until a matching linked-list entry is found that not only

3   stores target-value ranges including their associated target values, but also stores the sig-

4   nature information.

1   12. (CURRENTLY AMENDED) The intermediate network node of claim 11, further

2   comprising a processor,

3   wherein the memory is further ~~adapted~~ configured to store instructions for execu-

4   tion by the processor, at least a portion of the instructions defining a router operating sys-

5   tem configured to route the received packet based on a data flow associated with the re-

6   ceived packet.

1   13. (CURRENTLY AMENDED) The intermediate network node of claim 12, wherein

2   the <u>information associated with the linked-list entry is data-flow information and the</u> sys-

3   tem controller identifies <u>the</u> data-flow information stored in the matching linked-list entry

4   and transfers the data-flow information to the router operating system which routes the

5   received packet in accordance with the data-flow information.

1   14. (CURRENTLY AMENDED) An apparatus for efficiently searching a hash table con-

2   taining a plurality of ranges, the method comprising:

3   means for performing one or more preliminary range checks on at least one target

4   value, each preliminary range check generating an output value having a value dependent

5   on whether the target value is included in a predefined range of values associated with the

6   preliminary range check;

7   means for combining signature information with the output values generated by

8   the preliminary range checks to generate a modified signature;

5

9   means for applying a predetermined function to the modified signature to derive

10   an index that references a hash-table entry in the hash table;

11   means for locating a searchable data structure associated with the hash-table entry

12   referenced by the index, the searchable data structure comprising one or more search

13   nodes, at least one of the search nodes configured to store one or more target-value

14   ranges associated with the target value; ~~and~~

15   means for searching the search nodes in the searchable data structure until a

16   matching search node is found whose stored target-value ranges associated with the target

17   value include the target value. <u>and</u>

1   <u>means for providing information associated with the matching search node.</u>

1   15. (ORIGINAL) The apparatus of claim 14, wherein the searchable data structure is a

2   linked list and the search nodes in the searchable data structure are linked-list entries.

1   16. (ORIGINAL) The apparatus of claim 14, wherein the output values generated by the

2   preliminary range checks are concatenated with the signature information to generate the

3   modified signature.

1   17. (ORIGINAL) The apparatus of claim 14, further comprising:

2   means for searching the search nodes in the searchable data structure until a

3   matching search node is found that stores target-value ranges including their associated

4   target values and also stores the signature information.

1   18. (ORIGINAL) The apparatus of claim 17, wherein the signature information and the

2   target values are obtained from predetermined fields in a packet's network headers or

3   from other packet-related information.

1   19. (CURRENTLY AMENDED) The apparatus of claim 18, <u>wherein the information</u>

2   <u>associated with the matching search node is data-flow information and the apparatus</u> fur-

3   ther compris<u>es</u>~~ing~~:

4   means for extracting <u>the</u> data-flow information from the matching search node,

5   the data-flow information being used to route the packet.

1   20. (ORIGINAL) The apparatus of claim 14, wherein the means for applying a predeter-

2   mined function to the modified signature generates one or more output bits and a prede-

3   termined set of the output bits are masked to derive the index.

1   21. (CURRENTLY AMENDED) A computer-readable media including instructions for

2   execution by a processor, the instructions for ~~a method of~~ efficiently searching a hash ta-

3   ble comprising a plurality of ranges, the ~~method comprising~~ <u>instructions when executed</u>

4   <u>operable to</u>:

5   perform<u>e</u> ~~ing~~ one or more preliminary range checks on at least one target value,

6   each preliminary range check generating an output value having a value dependent on

7   whether the target value is included in a predefined range of values associated with the

8   preliminary range check;

9   combin<u>e</u> ~~ing~~ signature information with the output values generated by the pre-

10   liminary range checks to generate a modified signature;

11   apply<u> </u>~~ing~~ a predetermined function to the modified signature to derive an index

12   that references a hash-table entry in the hash table;

13   locate<u> </u>~~ing~~ a searchable data structure associated with the hash-table entry refer-

14   enced by the index, the searchable data structure comprising one or more search nodes, at

15   least one of the search nodes configured to store one or more target-value ranges associ-

16   ated with the target value; ~~and~~

17   search<u> </u>~~ing~~ the search nodes in the searchable data structure until a matching

18   search node is found whose stored target-value ranges associated with the target value

19   include the target value<u>; and</u>

7

20   provide information associated with the matching search node.